Differences Between Private Sector and Federally Constructed Beach Nourishment Projects

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Recognizing that the Coastal Engineering Research Board (CERB) is principally interested in research issues that could potentially enhance project performance and ultimately reduce project cost, it would be beneficial for the Board to reflect upon a number of fundamental differences between *Federal* and *non-Federal* projects. These differences manifest themselves in substantial cost differentials. For the most part, the majority of the higher project costs (and, sometimes, poorer project performance) associated with Federal shore protection works are driven more by administrative, procedural, and contractual requirements rather than technical factors.

The purpose of this presentation is to highlight major differences in the formulation, implementation, and performance between private sector (non-Federal) and Federal beach nourishment projects. It is important to note, however, that "private sector" projects are most commonly built for public entities. That is, the sponsors of non-Federal projects are typically counties, cities, taxing districts, etc. On rare occasions the project sponsor is a developer and/or a private owner group. Even in these instances, however, projects are commonly funded through a publicly sponsored special purpose Taxing District. Accordingly, both the private sector and the various Corps Districts nationwide generally serve the same types of public clientele in the implementation of the beach restoration alternative.

For purposes of brevity, the presentation will be limited to three (3) relatively important project parameters for which the federal and private sector experience tends to vary significantly. They are as follows:

- Time to Construct.
- Cost to Construct.
- Project Performance.

Time to Construct

From the formulation of a Reconnaissance-Level Report to final acceptance of the initial construction of a federal shore protection project, can easily take 8 to 12 years, or more. Both the level of plan formulation and review required by the Corps and the requirement for multiple congressional funding actions result in durations of project elements, which often become outrageously long. In contrast, for a project of identical complexity, permit issues etc., the time to construct a comparable non-Federal project from inception would typically be 24 to 48 months.

During such extended federal program schedules, it is not uncommon for local sponsor interest in an initial project to "vacillate" as a result of the turnover of elected officials. Moreover, Congressional support necessary to achieve critical funding milestones is likewise a non-Federal responsibility and therefore totally removed from the control or influence of the Corps District. The ability of a local sponsor to beneficially influence Congressional action on their specific project can vary dramatically depending on the nature of the governmental unit involved. Both of these factors can add additional time to the Corps' best estimate to bring a project on-line.

Cost to Construct

Presently, the cost of a Federal shore protection "feasibility" study *alone* amounts to 10 to 20 percent, or more of the overall cost to construct the project, and can take three (3) or more years to complete. For the most part, such feasibility studies are substantially less about design and more about policy compliance. Simplistically, they are exercises in proving to Higher Authority that projects are somehow justified in accordance with the morass of guidance and policy directives, specific to the federal shore protection program, which have been promulgated over the years. In contrast, private sector feasibility studies are unencumbered by such regulation and therefore free to appropriately focus on design issues, physiographic factors necessitating the proposed project and for the most part the specific needs of the client. That is, *non-Federal* shore protection projects become justified in accordance with the precept of satisfying the client's needs in the most cost-effective manner possible. This is in contrast to justifying requirements from Higher Authority within the Corps, which many would contend are presently intended to reduce federal involvement in the nation's shore protection program rather than solving large-scale beach erosion problems.

Beyond the issue of project formulation/justification, the construction costs of federal shore protection projects are similarly influenced by the Corps' burdensome procurement requirements, which significantly exceed those of the private sector. It is abundantly clear that federal regulations affecting contract terms, conditions, deliverables, etc., result in substantially increased costs to construct over essentially identical private sector projects. An additional economic burden to a federal project is the inability of the District staff to optimize the timing of the bid process to take advantage of the dredging industry's workload, equipment availability, etc. For projects which are dependent upon an industry with only three to four qualified firms, nationally, the strategic bidding of hydraulic dredging contracts by the private sector often results in unique levels of competition and resultant lower construction costs. A failure to encourage competitive bidding, coupled with excessive bureaucratic contractual requirements, can easily result in Federal contract costs for comparable projects, which exceed those of the private sector by an estimated 25 to 50 percent.

Project Performance

As expected, the design approach for Federal and non-Federal projects can likewise vary significantly. Although fundamental precepts regarding protection of upland property, enhancing recreational capacity of the beach *et cetera* remain essentially the same, the freedom of the non-Federal engineer to achieve those goals is substantially less encumbered in the design process. For the most part, the non-Federal project is not bound by the concept of a design beach volume fronted by advanced nourishment, derived in conformance with the standards mandated by an National Economic Development (NED) plan. Rather, the non-Federal engineer is free to address the shore protection problem at hand in a more holistic manner. In its simplest sense, the private sector design engineer has the option of exercising creativity over standardization. The ability to address "hot spots", unique template requirements, non-standard maintenance intervals and other project features which can have a direct bearing on project performance and longevity clearly serve to differentiate Federal and non-Federal project design practice.

For example, the strategic use of structures to augment beach-fill performance is an area where the performance of various non-Federal projects has been significantly enhanced over the last decade. This is particularly true where those shore protection projects are coincident with the termination of a littoral cell or where projects lie in the immediate zone of influence of navigation works, (i.e., jetties, maintained channels, etc.) Although it is acknowledged that numerous state (and to some degree Federal) regulatory programs are substantially biased in favor of prohibition of such structures, private sector engineers have a significantly freer hand in addressing regulatory objections or "concerns". Accordingly, the innate propensity of a District to acquiesce to inappropriate regulatory constraints or conditions generated by states, other Federal agencies or third-parties, can result in projects with less than optimum design characteristics which in the end compromise project performance.

A similar advantage of the private sector is the ability to delegate a qualified individual to be professionally responsible for the performance of all requisite activities necessary to achieve a cost effective design and to ensure that all aspects of the plan formulation are carried out as intended. This is an inherent weakness of the Corps' system where one group of individuals performs plan formulation, another group prepares design documents, another group secures permits, and another group performs construction management. With this type of segregation of professional responsibility it is frequently observed that design considerations recognized during design development can be completely misconstrued or misdirected during the construction phase. The net result is often compromised project performance.

Research Recommendations

As a private sector practitioner, I would make two (2) recommendations to the Board regarding potential research tasks, which could be facilitated by the U.S. Army Engineer Research and Development Center located at the Waterways Experiment Station:

a) Expand the body of knowledge regarding the dynamics of stabilizing structures on beach nourishment projects. Of specific interest are the following:

1. Identify the equilibrium beach elevation at the seaward end of a traditional groin, thus allowing prediction of the tidal shoreline location updrift of the groin.
2. Investigate the benefit of small heads on traditional groins.
3. Determine the conditions or dimensions at which increasing head size affects more of a headland shoreline response versus a groin response.
4. Investigate the effect of T-head groins versus nearshore (detached) headlands and the effect of permeable stems (trunks) on T-head groin structures.

b) Formulate for use by both federal and non-Federal engineers, a series of Coastal Engineering Design Notes, which summarize state-of-the-art design guidance regarding the use of structures with beach fill. An excellent example of such an effort is the Technical Note entitled, *Chronic Beach Erosion Adjacent To Inlets and Remediation by Composite (T-Head) Groins,* by Hanson and Kraus.